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10/511,883	10/19/2004	Young Hoon Park	YPL-0108	4213

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EXAMINER	
LUND, JEFFRIE ROBERT	
ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/511,883	Applicant(s) PARK ET AL.	
	Examiner Jeffrie R. Lund	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _08 July 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1,2,4-7 and 11-14_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1,2,4-7 and 11-13_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _19 October 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _2/14/08_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 2, 5-7, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi et al. (US 6231672 B1) in view of Kim et al. (US 6656282 B2) and Ogawa et al. (US Patent Application Publication 2002/0036066).**

Choi teaches a thin film deposition apparatus comprising:

i. A reaction chamber (200) in which wafers (not shown, see Title) are loaded; an exhaust line (from reactor 200 to pump 310) for exhausting gas from the reaction chamber (200); a first reactive gas supply unit (1110) for selectively supplying a first reactive gas to the reaction chamber (200) or the exhaust line (from reactor 200 to pump 310); a first reactive gas transfer line (21) for connecting the first reactive gas supply unit (1110) and the reaction chamber (200); a first bypass line (71) for connecting the first reactive gas supply unit (1110) and the exhaust line (from reactor 200 to pump 310); and a main purge gas supply unit (1130) for supplying a main purge gas to the first reactive gas transfer line (21) an MFC 3 (MFC on gas line 12) for controlling the flow rate of an inert gas – **in claim 1** (Fig. 2, Col. 3, lines 1-67). Choi further teaches a second reactive gas supply unit (1120) for selectively supplying a second reactive gas (and/or inert gas via MFC

3) to the reaction chamber (200) via a second reactive gas transfer line (22), or to the exhaust line (from reactor 200 to pump 310); a second bypass line (72) for connecting the second reactive gas supply unit (1120) and the exhaust line (from reactor 200 to pump 310); and a main purge gas supply unit (1130) for supplying a main purge gas to the second reactive gas transfer line (22) (Fig. 2, Col. 3, lines 1-67); a second path conversion unit (section between and including valves 122, 123, 124 and 125) for enabling the second reactive gas to selectively flow into the second reactive gas transfer line (22) and/or the second bypass line (72); an open/close valve (121) installed between the MFC3 and the reaction chamber. (Fig. 2, Col. 3, lines 1-67)

ii. The first reactive gas supply unit (1110) comprises: a source container (116) filled with a predetermined amount of liquid first reactant which will be the first reactive gas; an MFC 1 (on line 11, prior to 116) for controlling the flow rate of an inert gas fed into the source container (116); and a first path conversion unit (section between and including valves 0112, 113, 114 and 115) for enabling the inert gas or the first reactive gas to selectively flow into the first reactive gas transfer line (21) or the first bypass line (71) (Fig. 2, Col. 3, lines 14-32) – **claim 2**.

iii. The main purge gas supply unit (1130) comprises: an MFC 4 (MFC after purge gas supply 136) for controlling the flow rate of the main purge gas; and a third path conversion unit (section from and including valve 133 to 134) for enabling the main purge gas to flow [continuously] into the first reactive gas transfer line

(21) or [the second reactive gas transfer line (22)] (Fig. 2, Col. 3, lines 45-67) – **in claim 5**.

iv. A method for using the deposition apparatus, the method comprising: forming a thin film (Col. 1, line 8) on a substrate (wafer, Col. 1, line 8) loaded in the reaction chamber (200) by performing a first reactive gas feeding step (Col. 4, lines 15-32) in which the first reactive gas is fed into the reaction chamber (200) and a first reactive gas purge step (Col. 4, lines 33-38) in which the first reactive gas, fed into the reaction chamber (200), is purged, in a state where a roughing valve (on/off valve before pump 310 in exhaust line) positioned between the reaction chamber (200) and the exhaust line (from reactor 200 to pump 310) remains open, gases flowing through an inner point A (point between valves 112, 113, 114 and 115) of the first reactive gas supply unit and an inner point B (point between valves 122, 123, 124 and 125) of the second reactive gas supply unit continue to flow into the reaction chamber (200) or bypass lines (71, 72) (Fig. 2, Col. 4, lines 15-38; Col. 5, lines 9-28) – **in claim 6.**

Choi does not teach:

i. A radical supply unit for generating corresponding radicals by applying plasma to a second reactive gas and then selectively supplying the radicals to the reaction chamber or the exhaust line; a radical transfer line for connecting the radical supply unit and the reaction chamber and for transporting a main purge gas; a second bypass line for connecting the radical supply unit and the exhaust line; the radical supply unit comprises an MFC 2 for controlling the flow rate of the

second reactive gas; a remote plasma generator to which the MFC 2 and the MFC 3 are connected such that the second reactive gas and the inert gas are mixed together prior to being fed to the remote plasma generator, the remote plasma generator generating corresponding radicals by applying plasma to the second reactive gas and the inert gas; an open/close valve installed between the MFC 2 and the remote plasma generator – **in claim 1**.

ii. A radical transfer line – **in claim 5**.

iii. An atomic film deposition method using the remote-plasma atomic film deposition apparatus of claims 1, radicals are fed into the reaction chamber – **in claim 6**. Further, Choi does not teach the deposition process is repeated.

iv. The method of claim 6, after depositing a thin film, further comprising injecting radicals and an inert gas into the reaction chamber to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof – **claim 7**.

Kim teaches a remote plasma substrate processing apparatus comprising:

i. A radical supply unit (from Process Gas to Remote Plasma Generator 7) comprises: an MFC 2 (MFC2 prior to valve V12) for controlling the flow rate of the second reactive gas; a remote plasma generator (7) to which the MFC 2 (MFC2 prior to open/close valve V12) is connected such that the second reactive gas is fed to the remote plasma generator, the remote plasma generator corresponding radicals by applying plasma to the second reactive gas (Fig. 3, Col. 4, lines 60-67); then supplying the radicals to the reaction chamber (“To

Reactor," Fig. 3) (Fig. 3, Col. 4, lines 60-67) – **for claims 1 and 5**.

ii. A third path conversion unit (section from valve V4 to V5) for enabling the main purge gas to flow into the first reactive gas transfer line (from V3 to Reactor) or the radical transfer line (from V7 to Reactor) (Fig. 3, Col. 5, lines 20-30) – **in claim 5**.

iii. A method of using a remote-plasma atomic film deposition apparatus (Fig. 3) where radicals (7, Fig. 3) are fed into the reaction chamber ("To Reactor," Fig. 3) (Fig. 3, Col. 5, lines 60-67) – **in claim 6**, and the deposition process is repeated (Col. 3, lines 5-7).

Once Choi's second source container (126, Fig. 2) is replaced (see below) by Kim's remote plasma generator (7) and the rest of Kim's radical supply unit, Choi's second reactive gas transfer line (22) becomes a radical transfer line, which feeds radicals into the reaction chamber, also Choi's second bypass line (72) is then connected to the radical supply unit. After the replacement, Choi's inert gas is either fed into the remote plasma generator, or bypassed to exhaust via pipe 72.

iv. After depositing a thin film (Col. 2, line 13), radicals (7, Fig. 3) and an inert gas (N_2/Ar, Fig. 3) are injected into the reaction chamber ("To Reactor," Fig. 3) to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof (Fig. 3, Col. 2, lines 34-53) – **claim 7**

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to replace Choi’s second source container (126, Fig. 2) and vaporizing gas feed line (12, MFC, and valve 12) with Kim’s remote plasma generator (7) along with the rest of Kim’s radical supply unit (from Process Gas to Remote Plasma Generator 7 including supply line, MFC, and valve MV2), and to supply the plasma reactor with Kim’s group of reactants, and also to replace Choi’s continuously flowing third path conversion unit (section from and including valve 133 to 134) with Kim’s third path conversion unit (section from valve V4 to V5).

It would also have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the use of Choi’s apparatus by adding Kim’s sequence of plasma film forming steps.

Motivation for replacing Choi’s second source container with Kim’s radical supply unit and to use Kim’s group of reactants is to form film with remote plasma, which allows the supply of reactive materials (reaction radicals) at such low temperatures as to deposit oxide, nitride and metal thin films almost free of impurities as taught by Kim (Col. 2, lines 9-15 and 34-53).

Motivation for replacing Choi’s continuously flowing third path conversion unit with Kim’s third path conversion unit is for selectively purging the first reactive gas transfer line or the radical transfer line as taught by Kim (Col. 5, lines 20-30).

Motivation for optimizing the use of Choi’s apparatus by adding Kim’s sequence of plasma film forming steps is to deposit films almost free of impurities as taught by Kim (Col. 6, lines 58-67). Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205

USPQ 215 (CCPA 1980); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 1056 (Fed. Cir. 1990), MPEP 2144.05).

Choi and Kim differ from the present invention in that they do not teach that the remote plasma generator to which the MFC 2 and the MFC 3 are connected such that the second reactive gas and the inert gas are mixed together prior to being fed to the remote plasma generator.

Ogawa et al teaches a remote plasma generator 25 which is connected to gas sources 27 and 28 and supplying a mixture of gases (N_2, H_2, and NH3) to the remote plasma generator 25. (Fig. 1, paragraph 0035) Ogawa et al inherently has valves to control and adjust the mixture of the gas sources 27 and 28.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the gas supply piping of Choi and Kim such that the second reactive gas and the inert gas are mixed together prior to the plasma generator as taught by Ogawa et al.

Motivation for rearranging the gas supply piping of Choi and Kim is to provide an alternate gas supply system that allows the inert gas to function as a carrier and dilutant gas for caring the second reactive gas to the plasma generator and diluting the second reactive gas to maintain a desired level of concentration of the second reactive gas. Furthermore, it was held that the rearrangement of parts is obvious (see *In re Japikse* 86 USPQ 70).

3. **Claims 4, 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi et al. (US 6231672 B1), Kim et al. (US 6656282 B2) and Ogawa et al. (US Patent Application Publication 2002/0036066) as applied to claims 1, 2, 5-7, and 14 above, and further in view of Xia et al. (US 6258735).**

Choi further teaches:

i. A method for using a deposition apparatus (Fig. 2), the method comprising: forming a thin film (Col. 1, line 8) on a substrate (wafer, Col. 1, line 8) loaded in the reaction chamber (200) where a first reactive gas feeding step in which the first reactive gas is fed into the reaction chamber (200), and a first reactive gas purge step in which the first reactive gas is purged from the reactant chamber (200), in a state where a roughing valve (on/off valve before pump 310 in exhaust line) positioned between the reaction chamber (200) and the exhaust line remains open and gases flowing through an inner point A (point between valves 112, 113, 114 and 115) of the first reactive gas supply unit continue to flow into the reaction chamber (200) or bypass line (71) (Fig. 2, Col. 4, lines 15-65; Col. 5, lines 9-28) – **in claim 11**. Choi further teaches a second reactive gas feeding step in which the second reactive gas is fed into the reaction chamber (200), a second reactive gas purge step in which the second reactive gas is purged from the reaction chamber (200).

Choi does not teach:

i. An atomic film deposition method using the remote-plasma atomic film deposition apparatus of claims 1, the method comprising: forming a thin film on a substrate

loaded in the reaction chamber by repeatedly performing a radical feeding step in which radicals are fed into the reaction chamber, a radical purge step in which the radicals are purged from the reaction chamber, wherein the radical purge step comprises injecting only a radical corresponding to the inert gas (excluding the second reactive gas), which flows through the remote plasma generator, into the reaction chamber by way of the radical transfer line - **in claim 11**.

ii. The method of claim 11, wherein the sum of the flow rate of the inert gas flowing through the first reactive gas transfer line and the second reactive gas transfer line is maintained at a constant level during the first reactive gas purge step – **claim 12**.

iii. The method of claim 11, after depositing a thin film, further comprising injecting radicals and an inert gas into the reaction chamber to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof – **claim 13**.

Kim further teaches:

i. An atomic film deposition method using a remote-plasma atomic film deposition apparatus (Fig. 3), the method comprising: performing a radical feeding step (7, Fig. 3) in which radicals are fed into the reaction chamber (“To Reactor,” Fig. 3), a radical purge step (27, Fig. 3) in which the radicals are purged from the reaction chamber, a non-plasma reactive gas feeding step (23, 27, Fig. 3) in which the non-plasma reactive gas is fed into the reaction chamber (“To Reactor,” Fig. 3), and a non-plasma reactive gas purge step in which the first

reactive gas is purged from the reaction chamber ("To Reactor," Fig. 3) (Col. 3, lines 11-22) – **in claim 11**, and the deposition process is repeated (Col. 3, lines 40-41).

ii. **Regarding claim 12**, as discussed above, once Choi's second source container (126, Fig. 2) is replaced (see below) by Kim's remote plasma generator (7) and the rest of Kim's radical supply unit, Choi's second reactive gas transfer line (22) becomes a radical transfer line, which then would allow Choi's apparatus to enable the sum of the flow rate of the inert gas flowing through the first reactive gas transfer line (21) and the radical transfer line to be maintained at a constant level during the first reactive gas purge step (Col. 5, lines 15-28).

iii. After depositing a thin film, radicals and an inert gas are injected into the reaction chamber ("To Reactor," Fig. 3)) to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof (Fig. 3, Col. 2, lines 34-53) – **claim 13**.

Choi, Kim and Ogawa do not teach:

i. The radical supply unit further comprises a third bypass line for enabling the second reactive gas to selectively flow through the MFC 2 into the second bypass line – **claim 4**.

ii. An atomic film deposition method using the remote-plasma atomic film deposition apparatus of claims 1, the method comprising: while a first reactive gas is purged from the reaction chamber, gases flowing through an inner point D of the radical supply unit continue to flow into the reaction chamber or bypass line – **in claim**

11.

Xia teaches a plasma deposition apparatus comprising:

i. A bypass line (42) with a valve (40) for enabling a second reactive gas to selectively flow to the plasma generator (11) or to the chamber exhaust line (line from exhaust manifold 24 to pump 32) (Fig. 1, lines 6-45) – **in claims 4 and 11**.

Once Choi's second source container (126, Fig. 2) is replaced by Kim's remote plasma generator (7) and the rest of Kim's radical supply unit, and Xia's bypass line has been added between point D and bypass line 72, the combined references teach supplying the radical gas via MFC 2 and an inert gas via MFC 3 to the remote plasma generator. The combination also teaches bypassing the radical gas at point D prior to the remote plasma generator, thus an inert (purge gas) is continuously supplied to the remote plasma generator.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Xia's bypass line with valve to the radical supply unit in the apparatus of Choi, Kim, and Ogawa at a location, which we will use as point D of claim 11, between MFC2 and valve V12, and further to optimize the use of Choi's, Kim, Ogawa, and Xia modified apparatus by adding Kim's sequence of film forming steps.

Motivation to add Xia's bypass line with valve to the radical supply unit in the apparatus of Choi and Kim at a location between MFC2 and valve V12 is for the second reactive gas to circumvent the plasma generator allowing the reactive gas to stabilize prior to routing the gas to the plasma generator as taught by Kim (Col. 4, lines 23-30).

Motivation to optimize the use of Choi's, Kim, Ogawa, and Xia-modified

apparatus by adding Kim's sequence of film forming steps is for low temperature oxide, nitride and metal film deposition that's almost free of impurities as taught by Kim (Col. 2, lines 8-14, Col. 6, lines 60-67). Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

4. **Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choi et al. (US 6231672 B1) in view of Kim et al. (US 6656282 B2), Ogawa et al. (US Patent Application Publication 2002/0036066) and Arai et al. (US Patent Application Publication 2003/0170402 A1).**

Choi et al, Kim et al, and Ogawa et al were discussed above and differ from the present invention in they do not teach that the gas sources 27 and 28 of Ogawa et al have valves to adjustably combine the reactive gas and the inert gas with a variable mixing ratio.

Arai et al teaches a reactive gas source 24 and an inert gas source 21 connected to a remote plasma 13. Each gas source is connected to its own mass flow controller 22 for adjustably controlling the mixing ratio. (Figure 2C and Paragraphs 0052, 0053)

The motivation for adding mass flow controllers to the gas sources 27 and 28 of Choi et al, Kim et al, and Ogawa et al is to control the mixture ratio of the gases

supplied to the remote plasma source as taught by Arai et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the mass flow controllers of Arai et al to the apparatus of Choi et al, Kim et al, and Ogawa et al.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Response to Arguments

5. Applicant's arguments filed July 8, 2008 have been fully considered but they are not persuasive.

In regard to the arguments directed to the combination of Choi et al and Kim et al, the Examiner disagrees. The reactive gas supply unit of Choi et al (1120) can be divided into two parts. A precursor gas generator and the precursor gas delivery system. The precursor gas generator system extends upstream from the exit of the precursor source container 126 and includes the source container 126 and the vaporizing gas and its associated controls (i.e. piping, MFC, valves, source). The vaporizing gas is bubbled through the precursor source to generate a precursor gas. The precursor gas delivery system extends down stream from the exit of the precursor source to the reaction chamber and includes all of the valves, piping and MFCs to control the precursor gas supply to the reaction chamber. Thus there are two distinct parts of the reactive gas supply unit of Choi et al. Kim et al clearly teaches a precursor gas generator in the form of a source gas supplied to a remote plasma generator that

generates the desired precursor (i.e. reactive species). The combination replaces the precursor gas generator of Choi et al with the precursor gas generator of Kim et al to generate a known precursor (i.e. reactive species), and it has been held that the simple substitution of one known element for another to obtain predictable results is obvious (see *KSR International Co. v. Teleflex Inc.*). Therefore, the combination is proper.

In regard to the argument that Ogawa et al teaches that the gases from the sources are indiscriminately mixed, the Examiner disagrees. First, claim 1 only requires that the gases are mixed. Second, in the Semiconductor manufacturing industry, nothing is ever “indiscriminately mixed”. The exact concentration of the mixtures of the precursor materials is very important and is precisely controlled.

6. Applicant's arguments with respect to claims 14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (10:00 am - 9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrie R. Lund/
Primary Examiner
Art Unit 1792

JRL
9/30/08